BRIDGING THE GAP TO STRONGEST FAMILIES IN BRITISH COLUMBIA, CANADA

By

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Abstract

The high prevalence of mental health and/or substance use disorders has been identified as a public health concern in British Columbia, Canada. Peer-reviewed program evaluations and research studies have suggested that digital (internet, telephone, mobile application, e-mail, text) self-help programs coupled with a coach can improve adherence and mental health outcomes. Research also suggests that these programs, when guided by non-professional support, can foster similar benefits as traditional face-to-face mental health specialist supported treatments. This paper first aims to review the facilitators, barriers, and implementation strategies for integrating 'non-professionally' delivered e-mental health services within the Canadian context using a scoping review methodology. Psychosocial characteristics and costs were found to be major facilitators to implementation, while coaching expertise, controversies, and non-adherence/attrition rates were found to be barriers to implementation. Delivery methods could be both a facilitator or a barrier. The paper secondarily aims to create a plan to translate *Strongest Families* to British Columbia using the Innovation to Implementation (I2I) framework.

Keywords: mental health, mental illness, mental disorders, substance use, digital health, e-mental health, m-health, paraprofessional, self-help

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Introduction

In British Columbia (BC), an estimated 20% of people will be affected by a mental health and/or substance use problem (1). Youth under the age of 25 years will account for approximately 70% of those treated for mental health disorders, meaning that up to 84,000 BC children and youth (4 to 17 years) will be treated for mental disorders in 2017 alone (1). Psychotherapies are the most desired treatment option for those who seek help, yet these treatments have been found to be the least likely to be received in Canada (2). Further, many Canadians who are in need of mental health services do not even access help in the first place: 49% reported that they suffered from symptoms of anxiety or depression within the last 12-months, but did not seek out any professional resources (3).

The reasoning behind the barriers to receiving appropriate health care supports for mental disorders in Canada and British Columbia remain unclear, yet evidence does suggest that the quality of care patients receive can be a factor of their geographic and social location, stigmas, and preferences for informal help (1,3–6). Fragmented service delivery, difficulties getting referrals to specialists, and considerable wait times due to a lack of sufficiently qualified specialists may also contribute to limited access to desired treatments (4). Those without private insurance may also face significant cost barriers when forced to pay out-of-pocket because psychotherapies are not covered under the Canada Health Act's (CHA) "medically necessary physician and hospital services".

The gap is clear: mental health psychotherapies are not easily accessible, nor are they readily available for many Canadians experiencing mental health issues. Given the large prevalence of mental disorders within Canada and British Columbia, that suicide is one of the leading causes of death for Canadian men and women (3), and that the economy is spending upwards of fifty billion dollars on mental health care alone (4), it is imperative that efforts are made to improve the efficiency and quality of mental health service delivery for the sustainability of Canada's health care system.

Digital (internet, email, texting, telephone, videoconferencing) mental health service delivery methods are promising practices (7) that show positive outcomes in numerous quantitative and qualitative

peer-reviewed studies and systematic reviews (8–23). Digital mental health technologies have a reputation for having the capacity to cross geographical barriers, interrupt wait-times, provide anonymity, provide comfort for clients, and actively engage patients in facilitating their own positive mental well-being (24). Defined as "standardized psychological treatments that patients can use step-by-step instructions on how to apply a generally accepted psychological treatment procedure to [themselves]" (10, p. 1943), digital self-help interventions are appealing because they require minimal clinician support, thereby reducing the amount of financial and human resources (retention of staff, funding to provide the necessary specialist supports, time) that often hinder effective program implementation efforts (24). However, non-adherence and high attrition rates have remained a major concern when implementing effective self-help delivery methods (26).

Traditionally, psychotherapy is provided by a professionally trained and certified mental health specialist with substantial education and clinical expertise. However, therapy provided by non-professionals have shown promising results in numerous reviews (27–30). Recently, public health practitioners have begun to study if providers, who are not credentialed, can effectively deliver treatments using digital delivery methods (31–39). There have been no reviews completed on this topic yet. Theoretically, it has been proposed that non-adherence to digital self-help therapies can be mitigated through persuasive system designs that facilitate more interaction between the system and/or providers and patients (26). Interestingly, this theory suggests that social roles do not have to be human, but could involve digital avatars. In the literature, these types of human and technology-based interactions frequently surround primary task support, dialogue support, and social support methodologies (26).

The integration of non-professionals in digital mental health delivery could be an innovative, viable solution to providing accessible, individualized, and cost-effective treatment plans that alleviate resource burdens on the healthcare system, and help patients with mild-to-moderate symptomology access treatment earlier, stay out of the hospital, and/or avoid the criminal justice system (1). Further, this type of delivery has the capacity to help families find the right service when and where they are needed (1),

rather than remaining on a waitlist or receiving inadequate treatment because it is what is available, accessible, or affordable to them at the current time.

The Innovation to Implementation (I2I) Framework

The I2I framework aims to create change by bridging a gap between evidence and practice using knowledge translation activities (Figure 1) (40). Knowledge translation activities can be defined as the "interaction[s] between knowledge users and knowledge producers and results in mutual learning through the process of planning, producing, disseminating, and applying existing knowledge to enhance the health of Canadians" (24, p. 4). In the I2I framework, knowledge is first synthesized from scientific, experiential, pragmatic, and/or cultural learning. Then, an innovation is built upon the products, actions, services, and relationships that have the potential to enhance positive health outcomes. Finally, a plan is created to bring the innovation into effect through changes in practice or policy development. This paper will begin with a review systematically conducted scoping review, followed by a comprehensive I2I knowledge translation plan for *Strongest Families BC*.

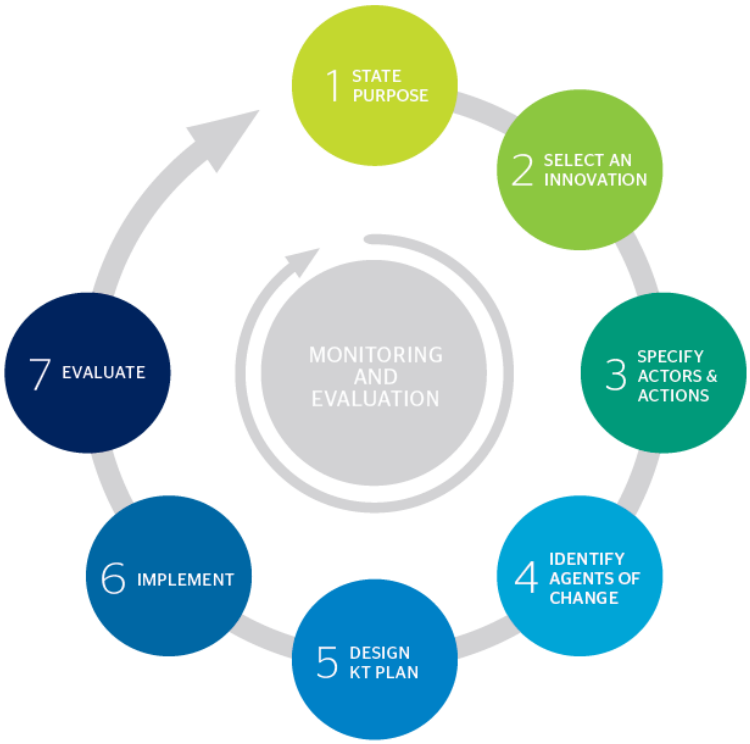

Figure 1. The Innovation to Implementation (I2I) framework cycle (40).

Review Purpose

The purpose of this review is to systematically identify promising practices (7) that "[contextualize] knowledge in terms of identifying the current state of understanding [to improve access to mental health services using non-professionals in e-mental health service delivery], identifying the sorts of things we know and do not know; and then setting [these findings] within policy and practice contexts" (1, p.2).

Methods

A scoping review framework was used (41) to provide an explicit description of the methodology, including the following phases:

i. Development of Research Questions

The overall research questions are: What is the extent of promising practices on using a non-professional within the delivery of e-mental health services? What is known from the existing literature about the impacts, barriers, facilitators, and implementation strategies of providing services in this manner?

ii. Location of Relevant Publications

The scope of this review focuses on identifying Randomized Control Trial (RCT) evidence-informed provisions to reflect promising practices (7) that can improve accessibility to mental health services using digital technologies and non-professional providers. Digital health interventions are defined as "internet-based healthcare delivery, or anything health-related that uses information and communication technology, incorporating computers, or internet in its delivery" (3, p. 2). The technologies reviewed include: videoconferencing, web-based, mobile applications, telephone, computer-assisted, texting, and email. Virtual reality was included in the search, but was ultimately excluded due to its current dependence on a specialist for monitoring and administration.

The interventions included all psychotherapies that were facilitated without primary contact with a clinician, including self-help and non-professional guided therapies. A 'non-professional' was defined as any individual, with direct contact with patients and their therapy, without certification training in a

designated mental health specialization program (29). Therefore, I excluded general practitioners, mental health counsellors, therapists, psychologists, and psychiatrists who traditionally deliver psychotherapies.

Digital mental health services focused on psychological interventions, defined as "cognitive behavioral therapy, psychodynamic psychotherapy, systemic therapy, third wave cognitive behavioral therapy, humanistic therapies, integrative therapies, and other psychological-oriented interventions"(4, p. 4). Drug-based interventions were excluded due to their undisputable requirement for prescription and monitoring through a physician.

The initial search strategy was broad in scope. Key words were selected to reflect the scope of the work related to e-mental health service delivery involving non-professional providers (Appendix A1/A2). Searches were conducted with database search engines PsycINFO and Ovid MEDLINE. Additional sources were identified by hand searching reference lists of studies identified as relevant from the initial search, as well as snowball searching in Google Scholar, and through interviews with experts at the UBC E-Mental Health Conference. Articles were included if they were published in English and in peer-reviewed journals. Inclusion was limited to RCTs published in the year 2012 to December 31, 2016[1], under the assumption that effective interventions published in earlier years would be identified through ongoing publications during this timeframe. Articles were excluded if they were letters to the editor, commentaries, dissertations, or reviews; used a mental health specialist as primary support; used social media; or focused on delivering mental health information, education, social support, or training.

iii. Screening and Selection of Publications

Figure 2 provides an overview of the search process and parameters. The search returned approximately 2336 articles. Article titles and abstracts were first scanned to determine relevance. All articles were independently reviewed using titles and abstracts, and the search strategy refined the total number through three iterations throughout the review process. To further refine the search, exclusion criteria were selected and applied over three additional constraint phases (Figure 2). For articles in which titles and

[1] The search was completed in January, 2017. Results were limited to "2012 to 2016 inclusive".

abstracts provided insufficient detail, full articles were evaluated. Specialists were consulted at the University of British Columbia E-Mental Health Conference to find any additional relevant articles for review. Following this, 21 RCT articles were deemed relevant (Figure 2; Appendix C).

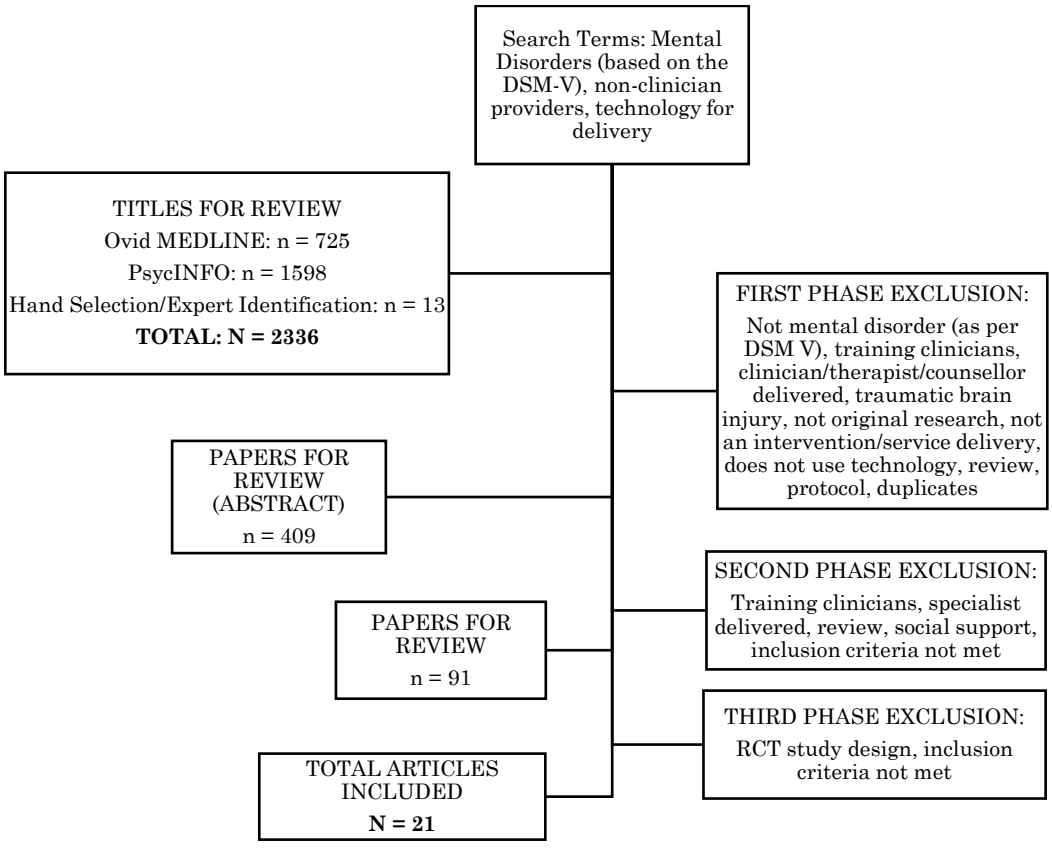

Figure 2. Search results.

iv. Charting the Data

Articles are organized according to level of support required for delivery. Articles were read in full, annotated, and entered into tabular format following Braun and Clarke's methodology for thematic analysis (43) (Appendix B). A charting table was developed to organize analysis by charting the article reference and program name, target population, mental disorder, technology, provider support, and type of therapy (Appendix C).

v. Collating and Summarizing the Results

Data were extracted according to several key characteristics including: intervention, technology, implementation strategies, length of study, cultural context, target population, control (Treatment as Usual [TAU] or waitlist), mental disorder, provider, training required, sample size and attrition rates, user/admin satisfaction and preferences, effect size, facilitators, barriers (including costs), and research gaps.

Critical Review of Relevant Literature

All the interventions included a digital method of delivering psychotherapy using a primary provider that was not a mental health specialist in at least one of the trial arms. Most of the studies were published in 2016 (Figure 3) and most in the United States (Figure 4). Study designs were initially diverse, then narrowed to include RCT only (Table 1).

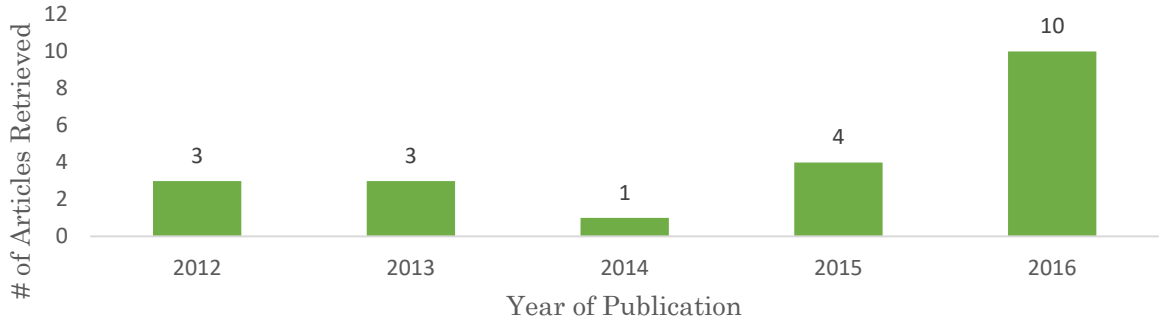

Figure 3. Distribution of RCT publication dates retrieved in the systematic search and included in the review

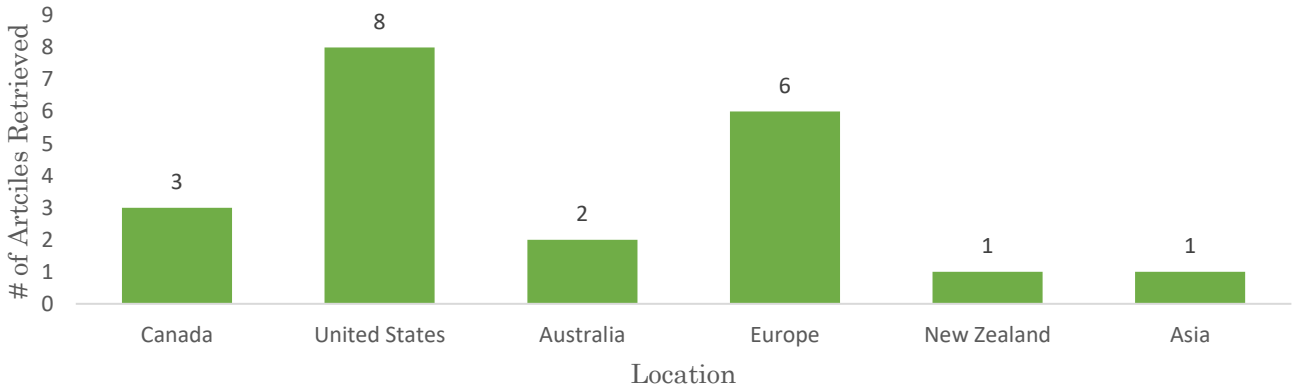

Figure 4. Distribution of study locations retrieved in the systematic search and included in the review

Table 1. Type of study retrieved in Phase 2 exclusion of the systematic search (N=91).

Study Design	Number of Studies Identified (n)
Descriptive Study – Program	8
Observational	1
Case Report	1
Case-Control Study	3
Qualitative Study	13
Quasi-Experimental	12
RCT	37
Questionnaire/ Survey	12
Review	4
TOTAL	91

Facilitators

Facilitators to implementation can be conceptualized from the perspective of the provider or service user (Appendix D). For providers, themes include human resource costs, as well associated costs with the delivery method. Facilitators for service users include flexibility, reinforcements, personal psychosocial characteristics, and accessibility.

Table 2. Overview of Digital Self-Help and Professionally-Guided Programs

Schwinn et al. 3 online sessions conducted by an animated young adult narrator through tailored content and practice scenarios that include interactive games, role-playing, and writing activities. Targets drug use in sexual minority youth.

Student Bodies: 8 online sessions combined with online, asynchronous, clinically moderated discussion group, psychoeducation on social skill and cognitive restructuring, a personal journal, and body image journal. Additional access to a weekly symptom checklist, body image exercises, and skills training elements. Targets eating disorders in university students.

ACT on College Life: 2 online multimedia sessions (audio narration, animation, text, graphics, interactive exercises) with supplementary e-mails, web-based resources, and text messages. Targets anxiety, depression, and stress in university students.

MoodGYM: 5 interactive online training modules aimed at increasing the users' knowledge and coping strategies with stress and interpersonal relationships. Includes 29 exercises to promote mental health. Targets depression and anxiety in youth.

BluePages: ~400 pages of online, text-based information on depression, including symptomology; general and specific sources of help; information about the effectiveness of medical, psychology and alternative treatments; and prevention. Targets depression in youth.

HAPA-Enhanced Mindfulness: 8 online modules (30 min/wk) on various mindfulness topics. Includes downloadable meditation audio recordings and videos for daily 20- to 30-minute mindfulness exercises. HAPA model includes action planning, action self-efficacy, recovery self-efficacy, and tailored reminder messages. Targets mental well-being in university staff and students.

Can Reduce: 8 automated modules designed to reduce cannabis use, and was based on the principles of motivational interviewing, self-control practices, and methods of cognitive behavioral therapy. Targets adults with cannabis dependency.

Wellbeing Course: 5 online lessons focusing on psychological skills that aim to increase the frequency of cognitions and behaviors that promote emotional health, and reduce those that maintain distressing symptoms. Targets adults with Generalized Anxiety Disorder, Social Phobia, or Panic Disorder.

Wellbeing Course Plus: 5 online, text-based lessons, homework assignments, and case-enhanced stories focusing on core transdiagnostic psychological principles and skills such as cognitive challenging, exposure and behavioral activation. Targets seniors with depression and anxiety.

MoodHacker: a mobile/computer application that allows users to track their mood, and positive cognitive and behavioral activities. Content about depression and benefits of CBT are delivered through emails, in-app messaging, and an "Articles & Videos" library. Targets adults with depression.

PTSD Coach: a mobile application that offers psychoeducation on symptoms and treatment, symptom monitoring, coping skills, and links to social support and professional resources. Targets veterans with PTSD.

SPARX (Smart, Positive, Active, Realistic, X-factor thoughts): an interactive fantasy game that uses both first person instruction and a 3-dimensional interactive game in which the person chooses an avatar and undertakes a series of 7 modules to "restore the balance" in a fantasy world dominated by GNATs (Gloomy Negative Automatic Thoughts). An avatar guide puts the game into context, provides education, gauges mood, and sets and monitors real-life challenges equivalent to homework assignments. Targets youth with depression.

Ludman et al.: 18-month self-management support service with of regular telephone or in-person contact with a care manager, and a structured CBT-group program co-led by a trained peer. Additional "drop-in hours" allow participants to engage in conversations focused on goals and strategies to facilitate recovery. Targets adults with chronic depression.

Stress Free Now: 8 week, online, interactive, educational mindfulness program provided in audio format that can be downloaded or played from the website. Targets employee stress management.

Feeling Better: 5 core modules organized in a multimedia workbook format that includes psychoeducation, real-life examples, videos, audio files, pictures, and activities. Trained peers provide support and encouragement, clarify information, and monitor participant progress through email and telephone support. Targets post-secondary student depression, anxiety, and stress.

Parenting Toolkit: a video-heavy, scenario-based hybrid instructional design where users chose a topic, view a short "stem" video depicting a problem situation, then are asked to choose 1-of-3 parental responses closest to what they would do. A Q&A mimicks a parent-therapist counselling session and guides the development of a personal action plan. Staff at the community technology center provide technical support for the program.

Mission Reconnect: an online program and mobile application that offers videos, guided audio exercises, and written manuals to teach mindfulness based-therapies, massage therapy, positive emotions, and caregiver education**.** Chaplains were trained to offer a "launch meeting" they provided participants with an overview of the program and the Prevention and Relationship Enhancement Weekend. Targets veterans with post-deployment multisymptomatic disorder.

DIRECT-sc: a self-care toolkit including an anti-depressant skills workbook offered in audio and text formats, a mood monitoring tool, and an informational DVD. Bachaelloreate, bilingual coaches introduce the tools, assess patients with the PHQ-9, and provide encouragement. Targets seniors with comorbid chronic physical conditions and depression.

Strongest Families Smart Website: parents complete 11 weekly online sessions that help develop skills to strengthen parent-child relationships, reinforce positive behavior, reduce conflict, manage daily transitions, plan for difficult situations, and encourage prosocial behavior. Paraprofessional coaches provide 45 minute telephone calls to review application of new skills, answer questions, and provide encouragement. Targets parents of children with disruptive behaviors.

Better Days/Better Nights: 5 online, text-based sessions that help parents learn how to increase and encourage positive behaviors that will improve sleep patterns in their children. Paraprofessional coaches provide 45-minute telephone calls to review application of new skills, answer questions, and provide encouragement. Targets parents of children with and without ADHD, and sleep problems.

i. Delivery Methods

Digital self-help and non-professional delivery methods facilitated engagement with patients who may not access formal services due to geographical barriers, a lack of suitable services in area, or had a personal preference for an informal delivery method (34,44,45). The convenience of accessing material at home allowed users to preserve their anonymity (33,46), remain confidential by using unique identifiers and passwords (33,44–47), and avoid any discrimination and/or stigmatization associated with treatment acquired with face-to-face delivery methods (32,44,46,48).

The flexibility and interactivity of online methods were other major facilitators to technology delivery methods. Some delivery methods allowed for service users to virtually log-in to the program at any time, and tailor their learning to engage with only material that interested them (32,34,37,46–48). On the other hand, service providers had the ability to tunnel critical program content in a step-by-step format to deliver content in predetermined, sequential lessons (45,48). *Can Reduce* (48) offered a mixture of both, whereby a series of core modules were tunneled, and additional modules were flexible.

Interactive designs could be facilitated through technology using reminders and suggestions to reinforce interaction with material. While some programs relied on push notifications to remind participants to engage in the material on a routine basis and complete their homework assignments (31,34,47–50), other programs allowed participants to opt-in to automated email, text, or telephone reminders (31,35,51–53). *ACT on College Life* (51,53) used email and text messaging to forward additional supplementary meditation materials to users, although only 16% accessed them.

For didactic (text-based) interventions, it was recommended that all material be presented at a 4th grade literacy level (49,54), in an appropriate language (55), and using multicultural representation in any visuals (56). It was also important that content could be accessed by users with auditory and visual disabilities (34). These features improved program literacy, and reduced attrition rates since the program context was adapted to service users' needs, and thereby seemed to increase their perception of value and liking of the program.

Systems with human coaches appeared to persuade users into increasing engagement with materials, by mitigating any uncertainties and providing encouragement (31–37,56). Interestingly, avatar coaching also appeared to increase adherence in SPARX suggesting that persuasive system designs may have the capacity to increase adherence without additional human supports (45). Ludman et al. (32) found that peer coaches were important coping role models for both diminishing symptoms of depression, and promoting well-being and life satisfaction. Peers were thought to emphasize the strengths and experiential knowledge of people with depression, and demonstrate that strengths and internal resources were highly valued. Involving non-professionals within service delivery also helped to de-stigmatize mental disorders.

ii. Psychosocial Characteristics

Self-help and non-professionally guided therapies were often targeted towards participants with mild-to-moderate symptoms, as compared to targeting participants diagnosed with severe mental health and/or substance use disorders. Users who had undergone previous clinical treatments were identified as "less responsive" to self-guided therapies for chronic depression (32). It was proposed that these types of participants would benefit more from intensive face-to-face care, and that self-help technologies should be targeted towards participants who exhibit less severe symptomology, and are unlikely to engage with in-person therapy due to practical limitations or preference. Alternatively guided therapies might be best utilized as an introduction to mental health services, but not long-term (36). Although the self-directed nature of the self-help design requires self-efficacy (35) and motivation (33,53,55) to stay engaged with program content, patients with less severe symptoms were often less motivated to adhere to self-guided treatments (35,48). Users needed to be comfortable with self-registration, self-directed homework, and undergoing self-report surveys (55). Only one-of-eight non-professional guided studies identified motivation as a barrier to use (33).

Age demographics (youth, adults, seniors) were not found to be a barrier to using digital interventions, although it was important to select a delivery method that was appropriate for the user's technology literacy level (47,52), and that followed a usability framework (47,56). Service users wanted the design features to remind them of themselves in some meaningful way. *ACT on College Life* (53) animations gave students

the impression that the program was targeted towards a younger audience, deterring engagement with the program. Therefore, it is critical to ensure content is appropriate and relatable to the target population. Target populations were diverse and can be reviewed in Appendix C.

iii. Costs

The low cost of administering and accessing digital psychotherapies is a major facilitator for both providers and service users in all studies identified. Self-help, web-based interventions required start-up costs associated with website design, encryption, and website hosting but after the development and refinements, the programs required relatively low administration costs and human resources to be sustained. Consequently, these services can be provided at much lower costs than clinician-based psychotherapies. No articles explicitly provided the cost breakdown of providing digital self-help.

While costlier than self-help programs, guided-interventions employing a non-professional provider to support service users were also low cost as compared to treatment as usual with a mental health specialist. In Canada, the cost of employing a paraprofessional was approximately $10,000 per year, not including costs associated to research requirements, as compared to $30,000 per year when employing a mental health specialist for the same type of work (33). The time spent with each patient ranged from 15 to 60 minutes on the telephone (32,33,35–37) and 1 to 2 emails per week (33), which is significantly less than the average time required for face-to-face therapy sessions (ie. eight weekly 2.5 hour session, 45 minutes daily of practice for 6 days per week) (46). Similarly, a few hours of video-based Behavioural Parent Training replicated the effects of 8 to 12 weeks of face-to-face support groups (56). The explicit costs of employing other types of non-professionals were not identified.

Barriers

Barriers to implementation can also be conceptualized from the perspective of the provider or participant (Appendix B2). For providers, themes include delivery methods and the associated costs, provider qualifications, controversies, and technology glitches. For service users, barriers include accessibility and compatibility of technology systems, psychosocial characteristics, attrition, and non-adherence.

i. Delivery Methods

Digital mental health programs cannot be all things to all people. The most common barrier included learning styles and formats that resulted in some users not finding the program relevant to their specific needs. For example, the generalized skills offered through the *Parenting Toolkit* were sometimes too simplistic to address complex psychological problems, increasing the risks associated with offering programs without support (56). *Mission Reconnect* (34) and *SPARX* (45) found that their delivery method required adaptation because the respective designs inherently excluded important members of the target population (such as those with disabilities). SPARX therefore offered paper supplementation of the material covered. Several other studies correlated the lack of perceived helpfulness with a lack of program generalizability (32,35,45,48,51,53,55–58).

The technology itself was another barrier to service providers and users. Technology glitches were nuisances that had to be mitigated by the providers. Often larger issues were mitigated through engagement with stakeholder advisory committees, and pilot or feasibility studies. However, technology support was always required adding an additional layer to implementation. Some file formats were incompatible with older devices, making lessons inaccessible for users that did not own newer device models (31). Mobile applications had to be available in Apple and Android compatible formats (47,58), and usable on computers, tablets and cellular devices. Some participants simply did not have access to the appropriate the technology in the first place (31) and/or were technology illiterate (55,58,59).

By large, technology solutions required less human and financial resources than in-person mental health services. However, the developers of *Parenting Toolkit* (56) identified cost as a barrier to developing high-quality multimedia production for their program. Resources associated with aesthetically appealing, high-quality web design significantly increased the costs associated with development. Additionally, hiring actors to create high-quality video components were costly. Authors mitigated this by balancing multimedia formats with text components to accommodate different learning styles, however the extensive text in *Bluepages* (>400 pages) was aversive to some participants (55).

ii. Coaching Expertise

Guided therapies required some level of a trained facilitator (peer, technician, baccalaureate, or graduate). These programs appear to show promising results as compared to waitlist and treatment as usual (Appendix C). Alternatively, programs offered through self-guided modes required no support, though sometimes offered an animated introduction (44,51,53), telephone (50) or email instructions (47–49,51,53,59), workshops (46), or provided detailed manuals and glossaries (48,55) before starting the program. These features helped to reduce complex programs and behavior changes into simple steps. The efficacy of self-help programs was mixed (Appendix C).

Some self-help therapies were compared with a clinician-guided therapy trial arm (31,48,50,52), which brings a highly-specialized level of expertise and vastly increases the operational costs of the program. These programs suggested that guidance was more beneficial than self-guided therapies (48,50,52), but there was insufficient evidence to suggest that clinical guidance was superior to non-professional guidance (31). In fact, just the invitation to chat and the knowledge that a resource was available improved outcomes for those using *Can Reduce* (48). These types of findings have led to significant controversy over the appropriate qualifications for support, as well as if human support is even necessary (self-help and avatar guides). Regardless, there was a common consensus across the studies that self-help and guided therapies provided benefit over remaining on a waitlist.

iii. Controversies

McCusker et al. (35) provided family doctors with the opportunity to refer patients to *DIRECT-sc*, however few did so. This reflects the slow uptake by or reluctance among healthcare professionals to use digital health solutions in the real world. It is possible that this controversy impacted the execution of *DIRECT-sc*, diverging patients who would otherwise be suitable and benefit. Controversies on the efficacy of digital health solutions will be a major barrier to mitigate when implementing innovative digital health solutions in real world contexts.

iv. Attrition & Non-Adherence

As discussed previously, lack of motivation, interest, and time were a major barriers for service users and led to high attrition (>30%) and non-adherence rates (31,33,46,48–50,53,59,60). Many of the studies with low attrition rates offered monetary incentives to complete components of the program. Therefore, it is unclear how generalizable the results of these studies are to real-life scenarios when monetary rewards are not practical reinforcements.

Implementation Strategies

i. Program Content

The programs obtained through the systematic search were primarily web-based, mobile applications, and telehealth. Participants were recruited through clinical settings, posters, and social media. Online components were initiated with an invitation through e-mail that included a link to the program. Web-based delivery methods involved multimedia components including graphics, audio, video, and text. Additional features to compliment the delivery of the programs include e-mail, text messaging, and in-application messaging.

Program content typically included a psycho-educational component and a skills-based learning component. *PTSD Coach* (52) also had a social support function which featured emergency contacts and allowed users to customize a contacts list by dropping contacts from their phone into a virtual social support directory. *MoodHacker* (47) and the *Strongest Families Smart Website* (36) communicated with the participants using their first name, which users found more personable. Material was reinforced in a variety of ways, including interactive games, scenario-based role-play, suggestions for additional resources, homework assignments, and reminders to engage in learning materials. Guided programs included routine engagement with coaches, ranging from monthly engagement (32) to weekly (36,37). *Better Days/Better Nights* (37) also helped parents create a rewards system to positively reinforce children when they performed a desired target behavior related to a goal. Many of the self-help and guided therapies included diary activities (37,44–48), which helped participants focus on specific problems that they were not aware of previously (37).

Self-guided therapies showed promising results when compared to waitlist control, however only small effects if any when compared to treatment as usual (Appendix C). These effects were often more pronounced short term, and tapered with non-adherence over longer-term follow-ups. Adding a social role (coaches) in guided therapy appeared to mitigate these effects. Guided therapies also appear to have a more positive trend when compared to treatment as usual, as compared to self-guided therapies (Appendix C).

ii. Coaching Expertise & Training for Guided Therapy Delivery

Coaching expertise, training, and engagement level varied between study, but include (45), peers (31–34), technicians (56), baccalaureates (35), and other paraprofessionals (36,37) (Appendix B1).

SPARX (45) used interactive avatars to guide users through the whole program and these avatars made tailored suggestions on content based on decisions made within the computer game. This type of interaction was embedded into the digital design.

Peer coaches were used to facilitate discussions, provided support and encouragement, clarify material, monitor program progress, administer reminders, and make referrals (31–34). *Stress Free Now* (31) required peer coaches to have completed the program, but did not describe any additional training. Chaplains in *Mission Reconnect* (34) received 12 hours of content training over teleconference which included information about how to facilitate the "launch meeting" with participants. The launch included a general overview of the program and instruction for how to engage with in-person relationship support groups. Ludman et al. (32) trained peer coaches with a 5-day training and certification program hosted by the *Depression and Bipolar Support Alliance*. Peer coaches were supervised by mental health specialists in all cases.

Parenting Toolkit (56) provided technician-assistance through staff at a community technology center. This involved help with logging into the program and general guidance for using computers. Technicians did not receive any additional training.

Two programs used baccalaureates to introduce users to the program material, provide encouragement and therapeutic support, administer psychological assessments, tailor programs to

patients, and to reiterate program material and monitor progress (33,35). *DIRECT-sc* (35) providers were trained by licensed clinician psychologists through reviewing coaching logs, listening to samples of audiotaped sessions, and receiving feedback on their performance. Providers were also monitored by the same psychologist throughout their employment. Coaching training for *Feeling Better* (33) was not described.

Finally, paraprofessional coaching included any non-credentialed providers (36,37). These coaches reviewed homework assignments, responded to inquiries, tailored programs to user needs, and provided support and encouragement to users. *Strongest Families* (36) providers received intensive training and a protocol, both developed and delivered through an experienced trainer. Coaching training for *Better Days/Better Nights* involved background readings, tests on the sleep program curriculum, mock call testing with trainers, and live participant call competency approval. Coaches also received periodic testing for call competencies where they would be assessed on quality assurance and fidelity of the program. A psychologist reviewed case reports on a weekly basis.

iii. Lesson Design

Web-based programs included from two to eight modules, lessons, and/or sessions involving content related to a range of psychotherapies (Appendix B2). Cognitive behavioural therapy was the most common psychotherapy employed, but others include mindfulness-based meditation, social competency skill building, behavioural parent training, acceptance and commitment therapy, dyadic therapy, interpersonal therapy, trans-diagnostic, motivational interviewing, and behavioural self-management. Shorter sessions (15 to 60 minutes) were found to be easier to disseminate, as they involve less time commitment from service users and are more cost effective. However, there was ongoing discussion about the difficulties of balancing rigorous content and time.

The level of engagement with non-professionals in guided therapies differed between studies. Most providers most commonly engaged with users on a weekly basis, however some were less frequent (once per month) or as per request. Ludman et al. (32) started with more intensive engagement including weekly

contact for the first 10 weeks, then engagement faded to twice per month for the next 2 months, then once per month for maintenance. However, attrition rates spiked after engagement was reduced.

iv. Models/Frameworks

Mak et al. (46) used the Health Action Process Approach (HAPA) to enhance the effects of mindfulness on mental health outcomes. HAPA is a psychological theory reduces health behavior change into 5 actionable steps: 1) action and maintenance self-efficacy, 2) action planning, 3) coping planning, 4) recovery self-efficacy, and 5) pop-up reinforcements. HAPA-enhanced mindfulness was more time efficient and participants appeared to "get more out of their practice" (28, p. 8), though this study had an extremely high attrition rate of 74.7%.

Parenting Toolkit followed the United States federal usability criteria for successful website development (www.usability.gov). This website provides methods, templates and documents, and guidelines for improving the user experience when developing technologies.

Can Reduce (48) and *PTSD Coach* (52) follow the Supportive Accountability Model (61), which suggests that adherence to digital health interventions can be enhanced by human support. This model proposes that human support can increase adherence through fostering accountability, reciprocity, and motivation through various digital communication mediums.

Limitations

This review was conducted using a scoping review framework, which is not exhaustive and does not weigh the quality of evidence. The goal is to rapidly map the key concepts underpinning a research area and the main sources, and types of evidence available (41). Because issues of quality are not addressed, this review has the potential to deal with a greater range of study designs and methodologies than a systematic review.

It is recognized that the scoping review methodology may have excluded additional sources of literature, however due to time and resources, it was possible to include only English publications, search within two databases, and exclude books and grey literature. Further, paper selection was conducted by only one primary reviewer (C. Stunden), and does not include extensive comparison to guided clinical

delivery. Should this information be implemented in practice, it is recommended to conduct a comprehensive needs assessment to ensure the program aligns with the needs and perspectives of the community.

Knowledge Translation (KT) Goals and Objectives

Table 3. Overview of the *Parenting the Active Child* program offer through *Strongest Families Smart Website* (36,62).

Program Content	Description
Parenting Skills Curriculum	Building relationships by noticing good behavior
	Spreading attention around to more than 1 child (positive relationship building)
	Ignoring whining and complaining
	Transitional warning and when-then statements
	Planning to manage behavior during events in the home
	Time out
	Charts and Stickers: positive rewards
	Planning for when others are around
	Losing points to decrease disruptive behavior patterns (ages 8-12 years)
	Working with the school
	Problem Solving
	Putting it all together: how to combine skills to deal with behavior as it occurs
	Two booster sessions to encourage maintenance of skills and outcome gains
Personalized Content	Reminders for upcoming appointments
	Prompted if visits to the website are infrequent
Weekly Activities & Reviews	Parents will complete activities to help make positive changes to improve their child's behavior, such as learning how to create routines, a healthy environment, and practicing techniques.
Paraprofessional Coaching	Weekly telephone sessions, 45 minutes in length to tailor program material and ensure understanding of content and skills.

To address the growing need for mental health services and reduce barriers to accessing psychotherapies in British Columbia, it is proposed to implement an adapted version of the *Strongest Families Smart Website* for children aged 2 to 12 with behavioural problems living within British Columbia, Canada (Table 3). Based on Behavioural Parent Training, this accessible, online program will utilize a multimedia program

and paraprofessional tele-coaching support to teach parents how to cope with common childhood behavioural disorders, such as temper outbursts, not listening, verbal and physical aggression, and difficulties paying attention (63). *Strongest Families* intends to actively engage parents to improve problematic behaviour and mental well-being.

Prior to content development, a comprehensive needs assessment will be conducted with parents and healthcare professionals within the Fraser Health Authority to identify context specific social, linguistic, cultural, financial, and technology barriers and facilitators to using *Strongest Families*. The assessment results will be used to tailor the program to Fraser Health's socioeconomic context.

Strongest Families BC will be a continuation of the original implementation within Nova Scotia, Canada (37) by the Strongest Families Institute. It will follow Canada's Ministry of Health guidelines, and the Supportive Accountability Model (61). Content will be refined with a community advisory committee (CAC), including healthcare professionals (incl. paraprofessionals, mental health, and pediatric specialists), researchers, parents, and a knowledge broker to ensure KT messages are tailored to populations and accurately reflect our goals. Taking on a primary prevention approach, the impact goals of *Strongest Families BC* include:

1. Improving the overall mental well-being of children living in BC.
2. Decreasing barriers associated with accessing evidence-based psychotherapies.
3. Increasing uptake of digital, non-professional guided therapies in BC.

Short-term and medium-term goals will target parents as agents of change and service providers as actors (Appendix F).

Audience and Partners

Strongest Families should initially launch as a pilot program including the *Parenting the Active Child* program in Surrey, and recruit parents with children between the ages of 2 to 12 with Oppositional Defiant Disorder (ODD). This intervention was selected due to its displayed efficacy, its collaborative development,

and its prevention approach. The program implementation will involve program stakeholders continuously throughout all planning, implementation, and evaluation phases.

A major project partner will be the Strongest Families Institute located in Nova Scotia. Local project partners should include Surrey Memorial Hospital, walk-in clinics, and pediatric, and youth mental health clinics in Surrey, BC. These partners will be important for marketing *Strongest Families* as a reputable option for treating childhood mental disorders to families, as they have an established community presence in Surrey. The implementation will also require support from health care providers (Fraser Health Authority, youth wellness centers, community services), a funding body (such as, the Foundry, the Canadian Institutes of Health Research or the Michael Smith Foundation for Health Research), content developers (such as, Digital Health Hub), and content disseminators (partners and research team). Strategic partnerships will be fostered with local community agencies, not-for-profits, and private investors for additional financial, implementation, and promotional support. The KT plan within this document is subject to change based on findings from the needs assessment, and input from the CAC.

KT Messages

Key messages to parents should reflect that *Strongest Families* is an accountable, legitimate, supportive, and accessible platform for parents to co-create a healthy parenting strategy for their child's behavioural problems, in addition to building capacity, resiliency, and skills for coping. The pilot project would focus on behavioural problems, however the Strongest Families Institute offers alternative programs for other mental health issues, such as anxiety, which could later be implemented.

Health care providers will learn about the efficacy of digital health solutions, the benefits of including paraprofessionals into the delivery of psychotherapies, and *Strongest Families'* capacity to improve mental health outcomes for children. The platform aims to be widely accessible and non-stigmatizing to alleviate patient traffic at primary care clinics.

Project partners will be provided with e-summaries of feedback reports, including performance indicators over yearly funding cycles to inspire change and encourage future support. Educational outreach,

including brief engagement workshops will allow for reflexive evaluative feedback opportunities for continuous system and quality improvements.

KT Implementation Strategies

The implementation of *Strongest Families* should focus on engaging two key audiences: parents and healthcare professionals. An Integrative Knowledge Translation Process (iKT) will be important to collaborate and shape the process continuously from funding acquisition, straight through to the end of the funding cycle. iKT involves knowledge users throughout the whole research process to produce results that are more favourable and relevant to those using them (64). This collaborative approach is consistent with the program's original development (62), and will increase the uptake of *Strongest Families,* as well as improve the likelihood that the program impacts other practice settings throughout BC (64).

It is also proposed to conduct a needs assessment prior to the development of the BC version of the program to better understand the learning needs, and areas of interest for parents and children living in BC. The needs assessment would include mixed methods, including surveys and focus groups with parents in the Fraser Health Authority to triangulate results. Additional focus groups or interviews should be conducted with health care professionals to determine the best ways to increase referrals to the program.

The program could be launched in collaboration with BellLetsTalk (January 2018), or Mental Health Awareness Week (May 2018) to tap-in to existing, active conversations about mental health through multimedia outlets, and reduce the costs associated with high-quality marketing. The process should include multiple methods, depicted below, to make information available to stakeholders in many forms (65).

i. Parents

Generate awareness, interest, and behaviour change to utilize Strongest Families BC.

The CAC will be instrumental in designing strategies for parents, however in the absence of their feedback for the creation of this document the following strategies are suggested. The promotion of *Strongest Families* should actively recruit users in school-based counselling services, Surrey Memorial Hospital, and

pediatric, mental health, and family medical clinics through referrals from counselors, therapists and clinicians (36,37,45). Passive marketing will occur through advertisements in local newspapers (Vancouver Sun, Metro Vancouver), and paper flyers that will be placed within schools, local doctor's offices, mental health and pediatric clinics (36,37,56). These advertisements will describe the platform. A take-home business card could also be created, including a QR code, the website address, and a brief program description. This business card will be widely available in the hospital and clinics, but also actively distributed to parents who have children with new diagnoses of ODD. The same business card will be available at community partner offices.

A mass media social marketing campaign will also be executed. This will include tapping-in to established mental health promotional events hosted by our project partners (such as Mental Health Awareness Week hosted by the Canadian Mental Health Association). Other large organizations that promote mental health initiatives include the Fraser Health Authority, Movember Foundation, and Bell.

Promotional materials will include infographics that will be emailed and posted in community parenting groups, advertisements in local newspapers, on social media (Facebook, Twitter, Instagram), and in clinics focusing on pediatrics or mental health. Additional marketing strategies may include interviews on local radio stations and commercials on children's television stations. Seeking endorsements by popular parenting and youth mental health websites such as Scary Mommy, MindCheck.ca, KidsHealth.org, Heretohelp.ca, AnxietyBC, and HealthLink BC will also be useful to build rapport. Cross promotion of the partner resources could occur through an "Additional Community Resources" tab on the *Strongest Families* platform.

It will be important to seek out a peer champion and organizational champion to promote *Strongest Families BC*. Ideally, these champions will be involved in ongoing promotions throughout the full duration of the program planning, implementation, and evaluation cycles to foster high creditability (40). The peer champion will have completed the program and be highly respected by service users. The organizational

champion will be perceived as highly creditable to our target partners. *Strongest Families* uptake will be improve when it is endorsed by individuals with these characteristics (40).

Impart ODD knowledge and parental skills for addressing childhood behavioral problems through the Strongest Families BC program.

Parents will be provided with a multimedia manual written at a 4th grade literacy level (49,54), including eleven sessions with a suggested completion rate of one session per week (36). Traditional handbook and videos will be offered in lieu to accommodate families with limited access to- and/or literacy for technology and/or internet. The website version will be protected by HyperText Transfer Protocol Secure (HTTPS) to protect patient safety and confidentiality (62) and the Strongest Families Institute developed IRIS system. IRIS an encrypted digital health platform that allows clients and coaches to confidentially interact with the program, while allowing administrators to monitor online activities. The core modules will be tunnelled as this program requires sequential completion of the program components (36,66), however prior to initial completion, participants will be granted flexible, open-access to the session material to review at their leisure. Each section will also feature instructional skills videos and audio clips to demonstrate program materials (36,62,63). Actors will be diverse to reflect BC's multi-cultural demographics. Adding a close-captioning feature to these components could improve accessibility for those with disabilities (34,52). Given the Lower Mainland's cultural diversity, I would also recommend translating this material into several languages identified through the needs assessment, to reduce language barriers (55).

The current program involves only one active parent in the program, while the other partner is encouraged to share the program content with the other partner when possible (62). Only 2.9% of primary caregivers were found to be male in a randomized control trial assessing *Strongest Families* (62), therefore I propose adapting the program and investing in resources to recruit and engage with both parental figures. Parents could engage in the online materials on their own time, then receive coaching sessions together to reduce costs of facilitating this adaptation. I would hypothesize that this feature would improve the

outcomes, as the child's environment will be more consistent when parents learn the same skills for coping with their child's problem behaviours.

Additionally, parents will receive up to 17 weekly telephone coaching support telephone calls from a paraprofessional for the duration of their enrolment (36). Coaches will ask questions and review online assignments to ensure parents demonstrate a good understanding of the session materials, and feel comfortable implementing the skills (36). These sessions will be 30 to 45 minutes in duration (36,37). Coaches will adapt the program material to suit parent needs, and their role will be important for mitigating any uncertainties and providing encouragement. These conversations will be tracked for statistical data on usage patterns. Again, given the population diversity in Surrey, I would recommend hiring multilingual coaches.

ii. Providers

Generate awareness, interest, and behavior change to utilize Strongest Families.

Providers will hold an integral position in training, coaching, and referring families to use the *Strongest Families* program. Provider KT strategies will be involving two subgroups: specialists and paraprofessionals.

The strategy for generating awareness and interest from specialists and paraprofessionals will involve a train-the-trainer approach (67). This approach involves training mental health and pediatric specialists in partner clinics about *Strongest Families* to subsequently generate interest with other professionals and patients. The process assumes that those being educated are local to other professionals and patients, have more direct access to these individuals, and a better understanding of the contextual issues affecting the training process (67). Initial trainers for this population will be recruited through the Strongest Families Institute.

Trainers will distribute infographics, e-summaries, and facilitate workshops to disseminate program information to other health care professionals. These sources have been suggested to be effective in the

clinical environment (65), but will be adapted to reflect the findings from the needs assessment. Information about *Strongest Families* will also be listed on our partner websites and other service websites offered through Fraser Health Authority, in addition to the magazine "Canadian Nurse", which is distributed to all nurses in Canada. Further awareness will be spread through other professional agencies (ie. Canadian Mental Health Association, BC Division), face-to-face educational workshops with prospective certified coaches, and online interactive educational seminars that can be offered through the Strongest Families Institute website. Additionally, the launch of the social marketing campaign will generate interest and awareness among health care providers. All messages will be constructed alongside CAC members to improve the straightforwardness and appeal (65).

Impart the knowledge and tools to generate a practice change from face-to-face, clinical delivery to online, paraprofessional delivery of parent behavioural training.

Health care provider attitudes towards the *Strongest Families* are critical to its success, thus it is proposed that using the train-the-trainer model will be best to deliver interactive educational outreach to mental health and pediatric specialists. Training will educate specialists on the knowledge and tools necessary to feel comfortable referring patients to Strongest Families, as this will be a practice change from face-to-face specialist delivery to online paraprofessional coaching. The training will follow the Unified Theory of Acceptance and Use of Technology (UTAUT) principles (68), which suggest educational outreach should include the incorporation of expected benefits, expected ease of use, opinions from within social networks related to the intervention, expectations of technical infrastructure and technical support, as well as addressing concerns regarding data security and general knowledge about *Strongest Families* (68).

Professionals will be incentivised to refer families to *Strongest Families* because of its cost-effectiveness, its capacity to relieve stress on the healthcare system through the employment of paraprofessionals, and it convenient accessibility in remote locations (65). The paraprofessional coaching model allows one coach to monitor thirty cases, and each case costs approximately $1000. It will be important to articulate the efficacy and efficiency of these programs to ensure uptake (35).

Paraprofessionals are instrumental for the coaching component of *Strongest Families* and will have lived experience, undergraduate, or graduate qualifications in healthcare disciplines, but will not be professionally certified to deliver psychotherapies for mental health disorders. Relevant disciplines may include psychology, biomedicine, physiology, neuroscience, social sciences, public health, and social work. Paraprofessionals could be recruited through post-secondary institution list-serves, postings on job recruitment websites (such as, Indeed), health clinics, and public health job posting e-bulletins.

Highly experienced coaches will be subsequently hired to train new coaching staff. Coaches will receive professional training that follows the Strongest Families Institute training protocol. This protocol involves training in relevant background readings, tests to demonstrate knowledge of the program curriculum, mock call testing with the trainer, and initial live participant call competency approval (36,37,66). Periodic calls by administrators will monitor coaches for quality assurance and to ensure ongoing fidelity of the program implementation (36,37,66). Difficult client cases, that are not responding to coaching, will be referred to a mental health specialist for more intensive treatment.

The training and monitoring of paraprofessional coaches requires a large investment to ensure essential competencies, therefore the Institute will aim to recruit and retain coaches for at least two years. Upon hiring, coaches will be required to work from within the Institute to allow for monitoring by administrators, however, more experienced coaches with consistent positive reviews may be provided the opportunity to work from home. Therefore, this coaching position may be an appealing career for to those who frequently relocate (ie. military spouses).

Evaluation Plan

The evaluation plan is informed by Sullivan et al.'s "Guide to Monitoring and Evaluating Health Information Products and Services" (69). The evaluation is based on the pre- and post- objective indicators for each of the short-, intermediate-, and long-term goals including the evaluation of usefulness (user satisfaction, product, and service quality), use, and improvements in mental health outcomes. The details of the evaluation plan can be found in Appendices G1-G3.

Resources Needed

The effective translation of *Strongest Families* will involve human, technical, and marketing resources. An estimated budget is provided in Appendix H. Under the assumption that the website design can be transferred to BC, resources will only be required to tailor the content and website design to be appropriate and user-friendly for BC residents. To ensure *Strongest Families* is confidential and secure, all features will be encrypted using the IRIS platform. This encryption platform was designed by the Strongest Families Institute and therefore requires no additional costs aside from upkeep. Personal health information will also be stored using IRIS and under British Columbia's E-Health (Personal Health Information Access and Protection of Privacy) Act Guidelines. All coaches should receive an e-training on the act to improve competency in e-health service delivery.

Given the online nature of the program, users must also have access to a telephone and the internet. Creating a mobile version of the platform that can be accessed via a tablet or smart phone could make the platform more accessible to busy families with limited time. Low-income users may require access to technology if they cannot afford a computer. Access to public computers could be offered through fostering a partnership with local community centers. Alternatively, traditional manual and video formats will be offered in lieu of the online materials. It is critical that coaches make an effort to ensure video formats are compatible with the participants' devices.

The human and financial resources required for *Strongest Families* include building partnerships with paraprofessionals to provide coaching support and training; mental health and pediatric specialists to refer potential new participants; and partnerships with local community organizations, not-for-profits, government agencies, and private donors to finance and promote *Strongest Families*. Possible funding opportunities may lay with the Canadian Institutes of Health Research, the Michael Smith Foundation for Health Research, and the EMDR Research Foundation. Other organizations that have identified interest in funding this type of program include Coastal Mental Health and Children's Foundation. Prospective funding strategies could involve agreements with the government to securing funding from private donors, which can then be matched by the BC government. The CAC group will include members of the research

team, parents, paraprofessionals, mental health and pediatric specialists, and a knowledge broker. Strongest Families is currently free of charge with referral from a physician, and is funded primary through governments and private investors. These costs could be reduced by collaborations with private insurers (eg. Pacific Blue Cross, BCAA, Sunlife Financial, Manulife Health Insurance) to provide coverage under private insurance premiums that partially or fully cover psychotherapies.

Dissemination resources will include mass media campaigns, and the UTAUT-informed educational outreach for users and providers of *Strongest Families*. Promotion will also occur through the train-the-trainers approach, as well as interactive online seminars, and information slides designed to be featured on television screens within health clinic waiting rooms. This implementation process will notably include a comprehensive, formative evaluation plan to reflect *Strongest Families*' design and objective indicators, including cost-effectiveness (Appendices G2/G3). The findings from this evaluation can be publish in a peer reviewed journal (JAMA Psychiatry, Journal of Medical Internet Research, JMIR mHealth and uHealth, Behavior Research and Therapy, or PLoS One).

Risks and Mitigation Strategies

Several possible risks and mitigation strategies are highlighted to help facilitate the KT of Strongest Families in BC from the perspective of providers and service users (Table 4). These have been informed by the review, best practices, and informal interviews with professionals.

One of the greatest barriers to receiving adequate care for mental health issues is the stigma associated with seeking help in the first place (31–37,44–53,55–57,59,70). Males and older populations are disproportionately burdened, possibly due to societal pressures that assume these demographics have greater responsibilities at work, in social relationships, and in society (48,55). For this reason, I predict that more resources may be required to recruit and maintain engagement with male parental figures. The remotely accessible, web-based delivery using encrypted and password protected log-in will aim to mitigate concerns with stigma, such as anonymity, confidentiality, and privacy. The mass media campaign will aim to raise awareness and reduce stigmas on a population level.

Table 4. Risks and mitigation strategies for successful KT of *Strongest Families*.

Target Audience	Risks	Mitigation Strategies
Service Users	Stigma	Social marketing campaign Anonymous, confidential online delivery Online referrals
	Time	Flexible online delivery
	Concerns about anonymity and confidentiality	Educational outreach Educational videos within waiting rooms
	Technology compatibility, accessibility, and usability	Continuous monitoring and feedback Audio, text, and video components with closed-captioning Community Advisory Committee Multiple languages
	Attrition and Non-adherence	Coaching Reminders
Mental Health and Pediatric Specialists	Lack of interest, willingness, and capacity to learn about Strongest Families	Train-the-trainers approach to increase uptake Peer and Organizational champions Advisory Committees
	Dispute between knowledge users and researchers	Knowledge broker
Paraprofessional Providers	Coaching expertise	Strongest Families Training Protocol Supervised by certified specialist Mental Health First Aid
	Resources to hire paraprofessionals	Funding Sources Contracts Private Insurance

Additionally, given that accessibility to the Strongest Families program requires a referral from an in-person visit to a doctor's office, there may be an untapped network of individuals who face significant barriers to receiving the referral (ie. extremely remote locations and/or those significantly impacted by stigmas). To make the platform more accessible to these people, a partnership with a telehealth program, such as LiveCare, which employs doctors to deliver healthcare and referrals through telehealth communication could be explored. This may improve referrals and uptake in remote communities.

Additionally, parenting is a challenging time of life wherein parents are often fatigued. Parents may not allocate time to complete the online lessons consistently. The flexible delivery, including flexible will be highly convenient for families who have limited free time and prefer to remain anonymous. Coaching and automatic reminders will notify users of upcoming appointments or prompt them to engage with the material if they have infrequent visits (63).

To ensure the technology is continuously compatible, assessible, and the interface has a high usability, ongoing monitoring and feedback will be facilitated through administrators. Additionally, various learning styles will be catered to using videos, audio and text-based lesson components offered in multiple languages (36,62,63).

The KT implementation literature suggests clinicians can lack interest, willingness and ability to learn and adopt new programs due to a lack of time, staffing resources, and competing clinical demands (65). To mitigate these possible risks, best practices have suggested clearly articulating the clinical value, clinical efficacy, ease of administration, and likability to clinical providers (65). New programs that articulate these benefits are more likely to be adopted and sustained in practice (65). *Strongest Families* is online and facilitated by a paraprofessional, therefore it will be important to articulate the programs capacity to reduce healthcare time burden disparities while maintaining the same (or improved) clinical efficacy as current treatment options, and that service users report extremely high satisfaction with the program (36,62,63). Meaningful engagement with the CAC, peer champions, and the train-the-trainers approach from the onset will aim to mitigate any controversies through improving knowledge, increasing buy-in and referrals, and highlight any additional concerns that may arise. A knowledge broker could serve as a third-party to mitigate any disputes that may arise between stakeholders and ensure upkeep with evolving best-practices.

The Supportive Accountability Model suggests that coaches should be accountable and seen as trustworthy, benevolent, and experienced (61). Many experts have engaged in controversy surrounding the appropriate level of expertise required to facilitate online guided therapies. Service users must

perceive the coach as legitimate and this can be influenced by both relational and instrumental factors. To ensure the coaches have the instrumental requisite expertise, they will be provided extensive training through the Strongest Families Institute protocol. Training in Mental Health First-Aid through the Mental Health Commission of Canada could provide additional mental health specific competency training for coaches. Secondly, to ensure paraprofessional coaches have the relational requisite trustworthiness and benevolence, ongoing monitoring by an experienced coach will occur through periodic calls for quality assurance (36,37,66) and reflexive, continuous evaluation.

Many organizations often lack the staff, funding, time, and other resources necessary to implement and maintain new programs (65). The ongoing costs of hiring coaches will add to the costs of delivering *Strongest Families BC*. Coaches will require sufficient training in competencies, and ongoing supervision to maintain high-quality coaching and program fidelity. A 2-year contract, with a 6-month probationary period, could be implemented to reinforce expectations for the retention of coaching staff and reduce costs associated with high staffing turnover.

Conclusion

Psychotherapies in British Columbia and Canada are largely inaccessible, costly, and health care professionals are overburdened by demand for psychotherapy treatments. This review has found that self-help and non-professionally guided therapies are more effective than waitlist controls, through can have high attrition and non-adherence rates. Combining digital health solutions with non-professional coaches is more effective than treatment as usual. These solutions could present a viable and effective solution to reducing the barriers to receiving effective psychotherapy treatments.

Strongest Families is a promising digital health program that utilizes paraprofessional coaches to guide parents through parent behavioural training for coping with childhood behavioural problems (incl. ODD). Paraprofessionals are trained extensively using the Smartest Families Institute protocol and supervised by a mental health specialist. This program could feasibly be implemented and evaluated in British Columbia.

Critical Reflection

The creation of this knowledge translation plan has provided me with an insightful experience on balancing the theoretical underpinnings and practical limitations of translating innovative programs into practice. Equitable access to mental health services is a major challenge for service delivery throughout Canada. While my practicum experience gave me insight into the barriers to seek out resources, this capstone experience has provided me an alternative perspective on the barriers to accessing affordable services after seeking help. Digital health strategies appear to have the power to facilitate delivery of these services, and I hope to continue to work towards bringing evidence into practice through the planning, implementation, and evaluation of innovative designs in the future.

During my capstone project, Dr. Elliot Goldner served as my supervisor, mentor, and inspiration for this work. It was a tragic loss when Dr. Goldner passed. This experience was by far the most challenging obstacle for me to overcome within my experience of my Master's program. I will be forever grateful for the knowledge he shared with me, for the opportunities he provided to me, and for the connections he helped me make before his passing. While his death was truly difficult, it provided me with an opportunity to grow through forcing me to build new connections, by learning how to be flexible, and how to preserver during difficult situations. This project serves to remind all whom knew Elliot and had the privilege to work with him of his legacy in mental health innovation.

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Appendix A1: OVID Medline Search Strategy

1 Mental Disorders/ (149733)

2 Mental Health/ (28740)

3 Community Mental Health Services/ or Community Mental Health Centers/ (20818)

4 Mental Health Services/ (30101)

5 Emergency Services, Psychiatric/ (2345)

6 Social Work/ (14471)

7 Geriatric Psychiatry/ or Preventive Psychiatry/ or Adolescent Psychiatry/ or Community Psychiatry/ or Military Psychiatry/ or Psychiatry/ or Child Psychiatry/ (49235)

8 Therapeutics/ (8314)

9 Cognitive Therapy/ (20943)

10 Psychotherapy/ (51341)

11 Therapy, Computer-Assisted/ or Virtual Reality Exposure Therapy/ (6437)

12 Telecommunications/ or Videoconferencing/ or Telemedicine/ or Remote Consultation/ (24196)

13 Computers/ or Electronic Mail/ (52860)

14 Telephone/ (10736)

15 Cell Phones/ (6796)

16 Mobile Applications/ (1792)

17 Text Messaging/ (1483)

18 Internet/ (60923)

19 (telepsychiatry or telepscyhology or "telemental health" or "emental health" or mhealth or ehealth or "digital mental health").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (3507)

20 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 (232605)

21 Nurse Practitioners/ (16451)

22 Health Personnel/ (30481)

23 Social Support/ or Peer Group/ (76501)

24 Nurses/ or Licensed Practical Nurses/ or Nurses, Community Health/ (35369)

25 Nurses' Aides/ (3975)

26 ("non-clinician" or "paraprofessional" or "non-credentialed" or train* or coach or "technician-assisted" or "non-professional" or "physician assistant").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (443686)

27 Physician Assistants/ (5011)

28 21 or 22 or 23 or 24 or 25 or 26 or 27 (591587)

29 Substance-Related Disorders/ (87781)

30 Behavior Therapy/ (26254)

31 1 or 2 or 3 or 4 or 5 or 6 or 7 or 29 (328714)

32 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 30 (256035)

33 28 and 31 and 32 (2880)

34 limit 33 to (english language and yr="2012 -Current") (725)

Appendix A2: PsycINFO Search Strategy

#	Query	Limiters/Expanders	Last Run Via	Results
S15	S11 AND S12 AND S13	Limiters - Publication Year: 2012-2017 Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	1,598
S14	S11 AND S12 AND S13	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	6,913
S13	S3 OR S4 OR S6	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	222,892
S12	S5 OR S7 OR S8	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	505,998
S11	S1 OR S2 OR S9 OR S10	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	366,173
S10	DE "Behavior Disorders" OR DE "Alcoholism" OR DE "Drug Addiction" OR DE "Addiction" OR DE "Drug Dependency" OR DE "Drug Abuse" OR DE "Substance Abuse and Addiction Measures" OR DE "Substance Use Disorder"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	110,612
S9	DE "Psychiatry" OR DE "Adolescent Psychiatry" OR DE "Child Psychiatry" OR DE "Community Psychiatry" OR DE "Geriatric Psychiatry" OR DE "Social Psychiatry" OR DE "Transcultural Psychiatry" OR DE "Psychology"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	82,096
S8	(DE "Peers" OR DE "Peer Counseling") OR (DE "Support Groups" OR DE "Group Counseling" OR DE "Group Psychotherapy" OR DE "Social Support")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	85,714
S7	TX "non-clinician" or "paraprofessional" or "non-credentialed" or train* or coach or "technician-assisted" or "non-professional" or "physician assistant" or "Nurses' Aide" or "medical	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	388,286

	office assistant" or "health care assistant"			
S6	TX ("telepsychiatry" or "telepsychology" or "telemental health" or "emental health" or mhealth or ehealth or "digital mental health")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	1,692
S5	(DE "Nurses" OR DE "Medical Personnel" OR DE "Psychiatric Nurses" OR DE "Public Health Service Nurses" OR DE "School Nurses") OR (DE "Health Personnel" OR DE "Mental Health Personnel")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	58,647
S4	(((((DE "Computer Assisted Therapy") OR (DE "Virtual Reality")) OR (DE "Online Therapy" OR DE "Telemedicine" OR DE "Cellular Phones" OR DE "Communication Systems" OR DE "Internet")) OR (DE "Hot Line Services")) OR (DE "Information Technology")) OR (DE "Mobile Devices" OR DE "Telephone Systems" OR DE "Text Messaging")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	56,484
S3	(DE "Anxiety Management" OR DE "Cognitive Behavior Therapy" OR DE "Psychotherapy" OR DE "Behavior Modification" OR DE "Self-Help Techniques" OR DE "Cognitive Techniques" OR DE "Cognitive Therapy") OR (DE "Psychotherapy" OR DE "Treatment")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	168,768
S2	DE "Mental Disorders"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	118,592
S1	(mental health) AND (DE "Community Mental Health" OR DE "Community Mental Health Centers" OR DE "Community Psychiatry" OR DE "Community Psychology" OR DE "Mental Health" OR DE "Primary Mental Health Prevention" OR DE "Community Services" OR DE "Social Services" OR DE "Community Mental Health Services" OR DE "Mental	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - PsycINFO	

Health Programs" OR DE
"Mental Health Services")

Appendix B: Steps of thematic analysis.

Table 5. Steps of thematic analysis as outlined by Braun & Clarke (43).

Steps	**Description**
Phase 1: Familiarize yourself with the data.	Transcribing data, reading, and reviewing the data, notating initial ideas
Phase 2: Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating the data relevant to each code
Phase 3: Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
Phase 4: Reviewing themes	Checking if the themes work in relation to the coded extracts and the entire data set, generating a thematic map of the analysis.
Phase 5: Defining and naming themes	On going analysis to refine the specifics of each theme, and the overall story, generating clear definitions and names for each theme.
Phase 6: Producing the report	Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back to the analysis to the research question and literature, producing a report of the analysis.

Appendix C: List of 21 RCT publications selected for inclusion in the scoping review.

Table 6a. Full list of the Self-Help RCT publications included in the review.

Self-Help Interventions	Target Population	Mental Disorder	Technology	Provider Support	Therapy
Schwinn et al. (44)	Sexual Minority Youth	General Drug Use	Web-based	Self-Help, Animated	SCSB
Jacobi et al. (57) *Student Bodies*	Female Undergraduate Students	Subthreshold Eating Disorders	Web-based	Self-Help, Monitored	CBT
Levin et al. (51) *ACT on College Life Pilot*	First-Year Undergraduate Students	Depression; Anxiety; Stress	Web-based; E-mail	Self-Help	ACT
Levin et al. (53) *ACT on College Life*	Undergraduate Students	Depression; Anxiety; Stress	Web-based; E-mail; Texting	Self-Help	ACT
Lintedt et al. (55) *MoodGYM & BluePages*	University Students	Depression	Web-based	Self-Help	CBT; IPT; MBT
Mak et al. (46) *HAPA-Enhanced Mindfulness*	University Staff; University Students	Mental Well-Being	Web-based	Self-Help	MBT
Powell et al. (59) *MoodGYM*	Adults	Mental Well-Being; Depression; Anxiety;	Web-based	Self-Help	CBT
Schaub et al. (48) *Can Reduce*	Adults	Cannabis; Dependency	Web-based	Self-Help	MI; CBT; BSM
Titov et al. (49) *Wellbeing Course*	Adults	Depression; Anxiety; Social Phobia; Panic Disorder	Web-based; Email	Self-Help	CBT; IPT
Titov et al. (50) *Wellbeing Plus Course*	Seniors (>60 years)	Depression; Anxiety	Web-based; Telephone	Self-Help	CBT' IPT
Birney et al. (47) *MoodHacker*	Employees	Mild-to-Moderate Depression	Web-based; Mobile Application	Self-Help	CBT
Possemato et al. (52) *PTSD Coach Pilot*	Veterans	PTSD	Mobile Application	Self-Help	CBT

MBM: Mindfulness-Based Meditation; CBT: Cognitive Behavioral Therapy; SCSB: Social Competency Skill-Building; BPT: Behavioral Parent Training; ACT: Acceptance and Commitment Therapy; DT: Dyadic Therapy; IPT: Interpersonal Therapy; TD: Transdiagnostic; MI: Motivational Interviewing; BSM: Behavioral Self-Management.

Table 6b. Full list of the non-professional guided RCT publications included in the review.

Non-Professional Guided Intervention	Target Population	Mental Disorder	Technology	Provider	Therapy
Ludman et al. (32)	Adults	Chronic Depression	Telephone	Peer	CBT
Allexander et al. (31) *Stress Free Now*	Employees	Stress	Web-based; CDs; MP3s	Peer	MBM CBT
Day et al. (33) *Feeling Better*	University Students	Mild-to-Moderate Depression; Anxiety; Stress	Web-based	Peer Baccalaureate Graduate	CBT
Merry et al. (45) *SPARX*	Youth (12-19 years)	Depression	CD-ROM, Computer Game	Avatar	CBT
Irvine et al. (56) *Parenting Toolkit*	Parents; Children (11-14 years)	Oppositional & Antisocial Behaviors	Web-based	Technician-Assisted	BPT
Kahn et al. (34) *Mission Reconnect*	Veterans	Post-Deployment Multisymptomatic Disorder;	Web-based; Mobile Application	Chaplain	DT
McCusker et al. (35) *DIRECT-sc*	Seniors (>40 years)	Depression	Telephone	Baccalaureate Graduate	CBT
Sourander et al. (36) *Strongest Families Smart Website (SFSW)*	Parents; Children (4 years)	Childhood Disruptive Behaviour	Web-based; Telephone	Paraprofessional	BPT
Corkum et al. (37) *Better Days/ Better Nights*	Parents; School-Aged Children with/without ADHD	Insomnia	Telephone	Paraprofessional	BPT

MBM: Mindfulness-Based Meditation; CBT: Cognitive Behavioral Therapy; SCSB: Social Competency Skill-Building; BPT: Behavioral Parent Training; ACT: Acceptance and Commitment Therapy; DT: Dyadic Therapy; IPT: Interpersonal Therapy; TD: Transdiagnostic; MI: Motivational Interviewing; BSM: Behavioral Self-Management.

Appendix D: Facilitators, barriers, and implementation strategies identified in the review.

Table 7a. Facilitators, barriers, and implementation strategies for self-help interventions.

Self-Help Interventions	Facilitators	Barriers	Implementation Strategies
Schwinn et al. (44)	Safe Non stigmatizing Non-discriminatory Low admin costs Broad reach Tailored Social Role Similarity Low attrition rates Confidential	Self-report Rewards	3 sessions Animated young narrator Interactive Games Role-Playing Writing activities
Jacobi et al. (57) *Student Bodies*	Likeable Social role Prevention-focused Accessible	Generalizability Self-report Symptom-focused	8 sessions Online Asynchronous Moderated group discussion Psychoeducation Self-monitoring Rehearsal Writing activities
Levin et al. (51) *ACT on College Life Pilot*	Interactive Simulation Self-monitoring Likability Usability	Generalizability Motivation	2 multimedia lessons Optional e-mails Animation Audio Didactic Graphics
Levin et al. (53) *ACT on College Life*	Rewards Interactive Simulation Self-monitoring	High attrition rates Non-adherence Length Tunneling Similarity	2 multimedia lessons Animation Audio Didactic Optional Text Messaging Optional e-mails Graphics
Lintedt et al. (55) *MoodGYM & BluePages*	Multiple languages Ease of use Literate Helpfulness Likability	Extensive Text (400 pgs) Generalizability Motivation Computer literacy Time Interactivity Self-report	5 training modules Manuals Didactic Graphics
Mak et al. (46) *HAPA-Enhanced Mindfulness*	Confidential Tailored Reminders Intro workshop Low cost Convenient Anonymous Accessible Non-stigmatizing Time	High attrition rates Non-adherence	8 modules (30 min/wk) Practice (20-30 min 6 days/ wk) Writing activities Pop-ups E-mails

Powell et al. (59) *MoodGYM*	Low cost Interactive Accessible Flexible Scalable Reminders	High attrition rates Non-adherence Low male participation Computer literacy	5 modules Graphics Online exercises
Schaub et al. (48) *Can Reduce*	Likability Usability Supportive Accountability Model Non-stigmatizing Tailored Reminders Tunneling (core modules) Flexible (extra modules)	Generalizability	4 core modules 4 supplementary modules Rehearsal Didactic E-mail Writing activities Glossary Emergency button FAQ section
Titov et al. (49) *Wellbeing Course*	Low intensity Reminders Low cost Rehearsal	Non-adherence Low engagement Consumer safety	5 lessons Transdiagnostic Online Didactic E-mails Graphics Rehearsal
Titov et al. (50) *Wellbeing Plus Course*	Reminders Suggestion Likable Perceived helpfulness	Requires monitoring Incentives	5 lessons Transdiagnostic Online Simulation Didactic Self-monitoring E-mail Telephone interview
Birney et al. (47) *MoodHacker*	Flexible Tailored Self-monitoring Personalization Confidential Generalizability Usability High quality production value Mobile user experience Suggestion	Incentives Duration of reminders	Mobile application Self-monitoring Rehearsal E-mails In-app messaging Didactic Videos Writing activities
Possemato et al. (52) *PTSD Coach* *Pilot*	Self-monitoring Evidence-based Participatory design Low cost Referrals Low attrition	Generalizability Non-accessible (technology)	Mobile Application Manual Didactic Optional reminders Suggestions Referrals

Table 7b. Facilitators, barriers, and implementation strategies for non-professionally guided interventions.

Non-Clinician Guided Interventions	Facilitators	Barriers	Implementation strategies
Merry et al. (45) *SPARX*	Interactive Gamification Tunneling Similarity Likeable Length of Modules High adherence Social Role Low costs Confidential Flexible Informal	Technical glitches Lack of time Lack of interest Perceived helpfulness Requires parental consent Exclusive	Computer game 7 Modules Paper supplementation Avatar guide Writing activities
Ludman et al. (32)	Flexible Tailored Social role Non-stigmatizing	Multicultural Difficult cases	Weekly engagement (10 weeks) followed by twice/month followed by once/month maintenance Telephone or In-Person Scripted Suggestion
Allexander et al. (31) *Stress Free Now*	Reminders Interactive	Lack of time Lack of access to technology Technology compatibility	Online Audio MP3 Psychoeducation Simulation
Day et al. (33) *Feeling Better*	Tailoring Social Role Confidential Economical Anonymous	High attrition rates Non-adherence Lack of motivation	5 core modules 6 weeks Emotional Support Technical Support
Irvine et al. (56) *Parenting Toolkit*	Multicultural Interactive Social learning Simulation Easy to use Likable Literate	Asynchronous Generalizability Costly Higher risk	Videos 8 Scenarios Suggestions Technical Support
Kahn et al. (34) *Mission Reconnect*	Social Role Cooperation Informal Accessible (Geographically) Reminders Likeable Safe Low cost Tailored	Exclusive Non-accessible (Disabilities)	Videos Audio Didactic 8 weekly reports Chaplain support Psychological, social, relationship, participation, and physical components

McCusker et al. (35) *DIRECT-sc*	Social role Participant self-efficacy	Preference for face-to-face contact Researcher contact Lack of doctor referrals Severe anxiety & depression Lack of motivation Recruitment location Frequency of coaching Coach qualifications	Scripted coach contact 3 core tools Audio Didactic Self-Monitoring Video Supervised Optional weekly telephone calls
Sourander et al. (36) *Strongest Families Smart Website (SFSW)*	Personalized Social learning Likeable Evidence-based Sustainable Low attrition rates High adherence Not therapist dependent Standardized format Easily updated	Human resources	11 weekly sessions Online Cooperation Simulation Video Audio Social Learning Telephone coach
Corkum et al. (37) *Better Days/ Better Nights*	Standardized manual Tailored coaching Accessible (geographically) Rewards Reduction Likeable Suitable for ADHD Adherence Coaching demeanor	Actigraph Time Lack of interest	5 sessions Written manual Telephone Coaching

Appendix E: Effect sizes.

Table 8a. Significant (p<0.05) between group, self-help versus control, effect sizes.

Self-Help Interventions	Outcome variable	Effect Size		Control
		Post	Follow-up	
Schwinn et al. (44)	Perceived Stress	d = 0.34, p < 0.05		Not described
	Coping Skills	d = 0.32, p < 0.05		
	Problem-Solving Skills	d = 0.32, p < 0.05		
	Drug Refusal Skills	d = 0.31, p < 0.05		
	30-day other drug use	d = 0.34, p < 0.05		
Jacobi et al. (57) *Student Bodies*	Weight & Shape Concerns (WCS)	d = 0.24	d = 0.27	Waitlist
	Body Mass Index	d = 0.00	d = 0.04	
	Total Core Attitudes & Symptoms of Disordered Eating	d = 0.35, p = .005	d = 0.62	
	General Disturbances (BSI)	d = 0.12	d = 0.05	
	Depression	d = 0.14	d = 0.15	
		Other p-values not reported	Other p-values not reported	
Levin et al. (51) *ACT on College Life* *Pilot*	Anxiety	d = 0.95, p = .003		Waitlist
	Depression	d = 0.97, p = .001		
	Stress	d = 0.81, p = .001		
	Relationship Success	d = 0.78, p = .043		
	Education Success	d =0.92, p = .033		
Levin et al. (53) *ACT on College Life*	No significant outcomes			TAU
Lintvedt et al. (55) *MoodGYM & BluePages*	Depression	d = 0.57, p < .001		Waitlist
	Negative Automatic Thoughts	d = 0.50, p < .01		
	Depression Literacy	d = 0.56, p <.001		
Mak et al. (46) *HAPA-Enhanced Mindfulness*	Mindfulness	d = 0.25, p = .002	d = 0.19	Waitlist
	Mental Well-Being	d = 0.24, p = .001	d = 0.24	
	Life Satisfaction	d = 0.22, p < .001	d = 0.26 P-value not reported	
Powell et al. (59) *MoodGYM*	Mental Well-Being	d = 0.34, p < .001		Waitlist
Schaub et al. (48) *Can Reduce*	No significant outcomes			Waitlist
Titov et al. (49) *Wellbeing Course*	Depression	d = 0.68, p < .001		Waitlist
	Anxiety	d = 0.55, p = .001		
Titov et al. (50) *Wellbeing Plus Course*	Depression Anxiety Geriatric Depression Psychological Distress Disability & Functional Impairment Life Satisfaction	No significant outcomes between group	No significant outcomes between group	None (Clinician Guided vs. Clinician Interview vs. Self-Guided)

Birney et al. (47) *MoodHacker*	Depression	d = 0.30, p = 0.01	TAU
Possemato et al. (52) *PTSD Coach* *Pilot*	PTSD Depression Psychological Quality of Life Social Quality of Life	No significant outcomes between group d = 1.46, p < .01	None (clinician vs self-guided)

d ($cohen's\ d$) as a measure of effect size with convention < 0.5 small, 0.5 < 0.8 moderate, and > 0.8 large.

Non-Professional Guided Intervention	Outcome Measure	Effect Size		Control
		Post	Follow-up	
Ludman et al. (32)	Depression Perception of Recovery	*not listed*		TAU
Merry et al. (45) *SPARX*	Depression	d = 0.30, p = .264		TAU
Allexander et al. (31) *Stress Free Now*	Stress Emotional Exhaustion Professional Efficacy Emotional Well-being Emotional Role Functioning Vitality Mindfulness	d = 1.20 d = 0.50 d = 0.40 d = 1.10 d = 0.80 d = 0.40	d = 1.00 d = 0.60 d = 0.40 d = 1.10 d = 1.00 d = 0.40	Waitlist
Irvine et al. (56) *Parenting Toolkit*	Parent-reported Conduct Problems Behavioral Intentions Parenting Self-Efficacy Over-reactivity Laxness Behavioral Intensity	n^2 = 0.017, p = .048 n^2 = 0.073, p = .001 n^2 = 0.072, p = .001 n^2 = 0.038, p = .003 n^2 = 0.048, p = .001 n^2 = 0.036, p = .004		Waitlist
Day et al. (33) *Feeling Better*	Depression Anxiety Stress	n_p^2 = 0.07, p = .03 n_p^2 = 0.08, p = .02 n_p^2 = 0.12, p = .004		Waitlist
Kahn et al. (34) *Mission Reconnect*	Perceived Stress Depression Stress Response PTSD Sleep Quality Self Compassion Usual Pain	 p = .006 p = .01 	p = .004 p = .004 p = .003 p = .002	Waitlist
McCusker et al. (35) *DIRECT-sc*	Depression	d = 0.43, p < .001		TAU
Sourander et al. (36) *Strongest Families Smart Website (SFSW)*	Externalizing Behaviour Internalizing Behavior Aggression Sleep Withdrawal Anxiety Emotional Problems Callousness Parenting Skills		d = 0.34, p < .001 d = 0.35, p < .001 d =0.29, p < .001 d = 0.37, p = .002 d =0.36, p = .005 d = 0.25, p = .003 d = 0.26, p = .001 d =0.31, p = .03 d = 0.19; p = .03 d = 0.53; p = .001	TAU
Corkum et al. (37) *Better Days/Better Nights*	Sleep Onset Bedtime Resistance	n_p^2 = 0.32, p < .001 n_p^2 = 0.12, p = .001	n_p^2 = 0.12, p = .001 n_p^2 = 0.08, p = .007	Waitlist

Sleep Duration	$n_p^2 = 0.09$, p = .004	$n_p^2 = 0.09$, p = .005
Sleep Disturbances	$n_p^2 = 0.41$, p = < .001	$n_p^2 = 0.16$, p = .001
Externalizing	$n_p^2 = 0.27$. p < .001	$n_p^2 = 0.15$, p = .018
Internalizing	$n_p^2 = 0.30$, p <.001	$n_p^2 = 0.12$, p = .043

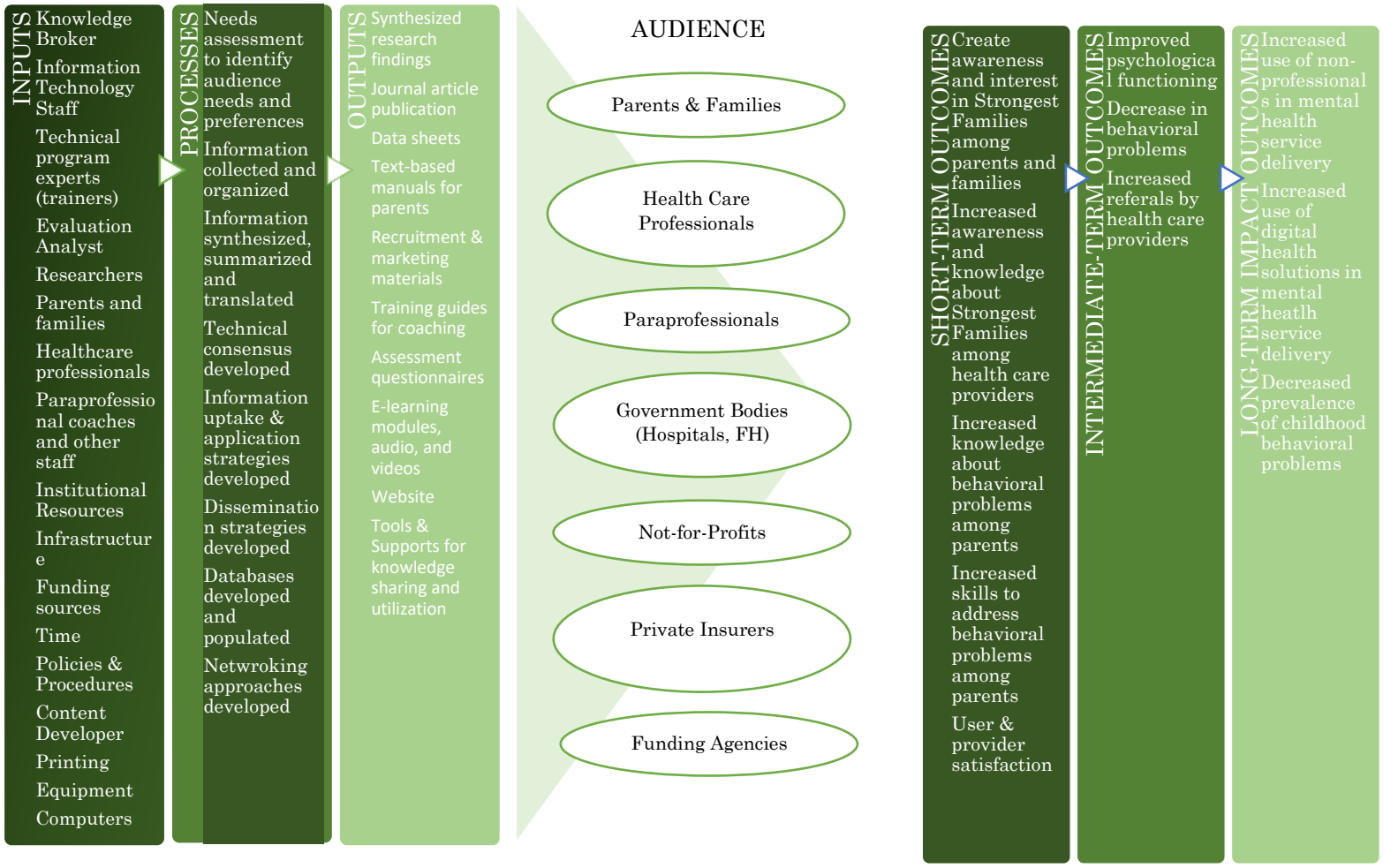
Table 8b. Significant (p<0.05) between group, non-professionally guided versus control, effect sizes.

n_p^2 (*partial eta squared*)as a measure of effect size with convention 0.01 small, 0.06 moderate, and 0.14 large

n^2 (*eta squared*)as a measure of effect size with convention 0.02 small, 0.13 moderate, and 0.26 large.

d (*cohen's d*) as a measure of effect size with convention < 0.5 small, 0.5 < 0.8 moderate, and > 0.8 large.

Appendix F: *Strongest Families* Logic Model



Appendix G1: Strongest Families Program Plan and Evaluation Timeline

(Time is indicated by quarter year)	Year 1	Year 2	Year 3
Preparation: • Connect with stakeholders to establish CAC • Hire a Project Manager • Apply for funding and establish timeline • Create needs assessment • Execute needs assessment and analyze • Draft KT plan in collaboration with CAC			
Development • Source subject matter experts to create content • Source out information technology and design experts to create platform • Design prototype platform • Beta-testing of prototype • Incorporate changes into platform • Initiate training of coaches • Review drafted Knowledge Translation Plan with CAC, checking for appropriateness and gaps			
Evaluation - Parents as the Audience • Monitor "reach" indicators • Adjust multi-media if targets are not met • Continuously monitor "reach" indicators • Evaluate "usefulness" indicators • Evaluate "use" indicators • Triangulation of data via interviews, focus groups and storyboarding • Meet regularly with CAC to review reach, usefulness, and use; pivot KT as needed • Publish evaluation findings in peer-reviewed journals • Consider randomized controlled trial of *Strongest Families BC* Evaluation - Providers as the Audience • Monitor "reach" indicators • Adjust multi-media if targets are not met • Continuously monitor "reach" indicators • Evaluate "usefulness" indicators • Evaluate "use" indicators Triangulation of data via interviews, focus groups and storyboarding			

Appendix G2: Strongest Families Smart Website Evaluation Plan and Indicators for Parents

Audience	Reach	Usefulness	Use
Parents Evaluation Components	**Number of Users** Data Source: Website user profile **% of users from target population** Data Source: demographics questionnaires	**Parenting Skills Curriculum** Data Source: Questionnaires and feedback reports -questions on content to test learning -embedded quiz after each module with questions about satisfaction, quality and relevance **Personalized Content** Data Source: Interviews -conducted with users over the telephone -consent for contact for evaluation purposes initiated upon registration **Weekly Activities** Data Source: Arts-based -workshop with arts-based storyboarding Data Source: Survey -Questions would include: useful Y/N ratings relating to satisfaction with coping skills **Paraprofessional Coaching** Data Source: Survey -Questions would include: useful Y/N and likert style questions relating to satisfaction with coaching	**Initial Assessment** Data Source: Registration Process -24-item externalizing scale of the Child Behaviour Checklist -Parenting Scale -Inventory of Callous-Unemotional Scale -21-item Depression, Anxiety, and Stress Scale **Post-Intervention** Data Source: Survey & Interview -same scales as initial assessment -satisfaction and quality assurance -coaches will reinforce completion in their final session **Follow-Up (6 months)** Data Source: Survey -24-item externalizing scale of the Child Behaviour Checklist -Parenting Scale -Inventory of Callous-Unemotional Scale -21-item Depression, Anxiety, and Stress Scale Web Traffic Data Source: Web Analytics -time spent within the site and each module -Number of visits per visit -Pages/Topics revisited
Parent Indicators	500 (estimated 5% registered caregiver users from BC by the end of year 1 25% increase in users per year	75% of users score 75% and above on post module assessments 75% of users report satisfaction with online learning modules 75% of users report satisfaction with coaching support 75% of users have both parents engaged in the program materials (modules & coaching)	75% of users report a less behavioral problems with their children 75% users report a decline in behavioral problems 75% of users report feeling more informed about behavioral problems and coping methods for ODD.

Appendix G3: Strongest Families Smart Website Evaluation Plan and Indicators for Providers

Audience	**Reach**	**Usefulness**	**Use**
Providers Evaluation Components	**Awareness of Strongest Families** Data Source: Online Survey -all health care members of our partner agencies and organizations Data Source: Applications -number of applications to job postings for paraprofessionals employment	**Positive Feedback on Platform** Data Source: Survey -Likert style following UTAUT principles	**# of Referrals** Data Source: User Registration -Question: How did you hear about Strongest Families?
Parent Indicators	50% of providers report awareness of Smart Families 50% of providers are aware of the benefits of digital health solutions, and using paraprofessionals in service delivery	75% of providers who are aware of the platform find it useful, rigorous, and evidence based	25% of patients with behavioral disorders are referred to *Strongest Families*

Appendix H: Estimated Strongest Families Budget

The costs of hiring coaches and delivering the program through the current Strongest Families Institute in Nova Scotia is approximately $1000 per child. To develop a Strongest Families Institute in British Columbia, see the estimated costs below. This estimate assumes a partner organization will have the infrastructure to house the institute. Office space at Surrey Memorial (CC2) costs $1500 per square foot, equating to approximately $5000 per month or $60,000 per year.

Operational Costs	Sum of Year 1	Sum of Year 2	Sum of Year 3	Sum of Year 4	Sum of Total
Dissemination Material	10,000	5,000	5,000	5,000	25,000
HTTP Website Hosting	180	180	180	180	720
Internet	1,200	1,200	1,200	1,200	4,800
IRIS	0	0	0	0	0
Needs Assessment	25,000				25,000
Ongoing Evaluation		30,000	30,000	30,000	90,000
Professional Development (Training)	50,000	25,000	25,000	25,000	125,000
Quality Assurance	10,000	10,000	10,000	10,000	40,000
Software Subscriptions (Microsoft Office, Nvivo, Fluid Surveys)	2,000	1,500	1,500	1,500	6,500
Grand Total	**98,380**	**72,880**	**72,880**	**72,880**	**317,020**

Material Costs	Sum of Year 1	Sum of Year 2	Sum of Year 3	Sum of Year 4	Sum of Total
Computer Hardware & Software	$10,000	$5,000	$5,000	$5,000	25000
Mass Media Campaign	$50,000	$25,000	$25,000	$25,000	125000
Other	$1,000	$1,000	$1,000	$1,000	4000
Print Materials	$2,000	$1,000	$1,000	$1,000	5000
Research Journal Publications	$2,000		$2,000	$2,000	6000
Telephone	$1,500	$1,200	$1,200	$12,000	15900
Train-the-Trainers	$2,000	$2,000	$2,000	$2,000	8000
Grand Total	**$68,500**	**$35,200**	**$37,200**	**$48,000**	**188900**

Human Resources	Sum of Year 1	Sum of Year 2	Sum of Year 3	Sum of Year 4	Sum of Total
Clinical Advisory Board (CAC)	$2,000	$2,000	$2,000	$2,000	$8,000
Clinical, Scientific, & Community Advisory Board (CAC)	$1,000	$1,000	$1,000	$1,000	$4,000
Educational Outreach Facilitators	$2,000	$1,000	$1,000	$1,000	$5,000
IT Staff	$50,000	$50,000	$50,000	$50,000	$200,000
Knowledge Broker (0.25 FTE)	$15,000	$15,000	$15,000	$15,000	$60,000
Marketing Advisor (0.5FTE year 1, 0.25 FTE year 2-4)	$25,000	$12,500	$12,500	$12,500	$62,500
Organizational Champion	$1,000	$1,000	$1,000	$1,000	$4,000
Paraprofessionals/Technical Program Experts	$10,000	$10,000	$10,000	$10,000	$40,000
Peer Champion	$500	$500	$500	$500	$2,000
Project Manager (0.5 FTE year 1, 0.25 FTW year 2 to 4)	$30,000	$15,000	$15,000	$15,000	$75,000
Research Assistant - Evaluation (0.5FTE)	$-	$25,000	$25,000	$25,000	$75,000
Research Assistant - Needs Assessment (0.5 FTE)	$25,000	$-	$-	$-	$25,000
Scientific Advisory Board (CAC)	$2,000	$2,000	$2,000	$2,000	$8,000
Trainers	$-	$-	$-	$-	$-
Grand Total	**$163,500**	**$135,000**	**$135,000**	**$135,000**	**$568,500**